

CLAIMS

What is claimed is:

- 1 1. An independent display system for a computer aided detection
2 (CAD) system that analyzes medical images, the independent display system
3 comprising:
4 an input mechanism to receive an identifier for a medical image;
5 a touch screen to display the medical image including any marked regions
6 of interest;
7 a plurality of icons to interact with the touch screen, such that the
8 independent display system does not require a keyboard or cursor controller.
- 1 2. The independent display system of claim 1, wherein the input
2 mechanism is a barcode scanner.
- 1 3. The independent display system of claim 1, wherein the input
2 mechanism is a camera.
- 1 4. The independent display system of claim 1, wherein the input
2 mechanism is a microphone and a voice recognition system.
- 1 5. The independent display system of claim 1, wherein the input
2 mechanism is selected from among the following: a keyboard, a limited keyer, a
3 mouse, a trackball, a pen.

1 6. The independent display system of claim 1, wherein the
2 independent display system is modality independent.

1 7. The independent display system of claim 1, wherein the screen of
2 the independent display system is designed to be placed in proximity to a film
3 viewer, and is operable with existing film viewers.

1 8. The independent display system of claim 1, wherein one of the
2 plurality of icons is a layout indicator shown on the display indicating a lightbox
3 to which a currently displayed medical image corresponds.

1 9. The independent display system of claim 8, wherein the image
2 remains associated with the lightbox on the layout indicator, such that previous
3 images are recalled by selecting the appropriate lightbox.

1 10. The independent display system of claim 8, wherein the layout
2 indicator comprises:
3 an icon of the independent display system positioned in proximity to one
4 or more icons of light boxes, reflecting an actual layout in a current location.

1 11. The independent display system of claim 8, further comprising:
2 a layout logic to permit the user to alter the layout indicator to correspond
3 to an actual layout in a current location.

1 12. The independent display system of claim 11, further comprising:

2 a number of preset potential layouts among which the user can choose.

1 13. The independent display system of claim 12, further comprising:
2 a programming logic permitting the user to create a customized layout
3 indicator.

1 14. The independent display system of claim 8, wherein the user selects
2 the lightbox on the touch screen by touching the appropriate light box when an
3 image is called up.

1 15. The independent display system of claim 1, wherein one of the
2 plurality of icons is a printer icon, permitting the user to print the medical
3 images including any marked regions of interest.

1 16. The independent display system of claim 15, wherein the printer
2 icon is present when the printer is enabled and connected to the system.

1 17. The independent display system of claim 15, wherein the printer
2 icon indicates whether the printer is available for use, offline, or out of paper.

1 18. The independent display system of claim 1, wherein one of the
2 plurality of icons is a display adjustment icon, permitting the user to adjust a
3 quality of the medical images displayed.

1 19. The independent display system of claim 18, wherein the display
2 adjustment icon includes a plot of the display adjustment, indicating the
3 adjustment made.

1 20. The independent display system of claim 18, wherein the display
2 adjustment icon is a brightness and contrast icon, permitting the user to adjust
3 the brightness and the contrast of the image.

1 21. The independent display system of claim 20, wherein the
2 brightness and contrast icon further includes a reset area, such that when the
3 reset area is pressed by the user, the brightness and the contrast are reset to their
4 original values.

1 22. The independent display system of claim 18, wherein the display
2 adjustment icon is a gamma icon permitting the user to increase and decrease the
3 gamma of the image.

1 23. The independent display system of claim 22, wherein the gamma
2 icon further includes a reset area, such that when the reset area is pressed by the
3 user, the gamma value is reset to the original value.

1 24. The independent display system of claim 1, further comprising a
2 delay mechanism to delay displaying the image.

1 25. The independent display system of claim 24, wherein the delay
2 mechanism may be disabled.

1 26. The independent display system of claim 1, further comprising an
2 auto load mechanism to permit review of a preprogrammed series of images.

1 27. The independent display system of claim 26, wherein one of the
2 icons is a series movement icon to show a selected image in the series.

1 28. The independent display system of claim 1, further comprising a
2 historical review to show historical images of the same modality and the same
3 patient as the current image.

1 29. The independent display system of claim 28, wherein a set of the
2 plurality of icons are icons permitting navigation among the historical images.

1 30. The independent display system of claim 29, wherein the set of
2 icons include a current image icon, a baseline image icon, and navigation icons to
3 navigate a plurality images between the current image and the baseline image.

1 31. The independent display system of claim 28, further comprising a
2 loading logic to identify a patient and modality based on the identifier of the
3 medical image, and to load the appropriate historical images in response to a
4 user request.

1 33. The independent display system of claim 32, wherein the patient
2 information is patient data and patient history data.

1 34. The independent display system of claim 32, further comprising:
2 the touch screen to display the patient information.

1 35. The independent display system of claim 32, further comprising a
2 disabling logic to disable the loading unit from loading the patient information.

1 36. The independent display system of claim 32, wherein one of the
2 icons is a toggle to display patient information.

1 37. An independent display system for a computer aided detection
2 (CAD) system, the independent display system comprising:
3 a display;
4 a user interface to permit a user to interact with the display;
5 a layout indicator shown on the display indicating a lightbox to which a
6 currently displayed image corresponds.

1 38. The independent display system of claim 37, wherein the layout
2 indicator comprises:

3 an icon of the independent display system positioned in proximity to one
4 or more icons of light boxes, reflecting an actual layout in a current location.

1 39. The independent display system of claim 37, further comprising:
2 a layout logic to permit the user to alter the layout indicator to correspond
3 to an actual layout in a current location.

1 40. The independent display system of claim 39, further comprising:
2 a number of preset potential layouts among which the user can choose.

1 41. The independent display system of claim 40, further comprising:
2 a programming logic permitting the user to create a customized layout
3 indicator.

1 42. The independent display system of claim 37, wherein the display is
2 a touch screen.

1 43. The independent display system of claim 42, wherein the user
2 selects the lightbox on the touch screen by touching the appropriate light box
3 when an image is called up.

1 44. The independent display system of claim 37, wherein the
2 independent display system is modality independent.

1 45. The independent display system of claim 37, wherein the screen of
2 the independent display system is designed to be placed in proximity to a film
3 viewer, and is operable with existing film viewers.

1 46. The independent display system of claim 37, wherein the image
2 remains associated with the lightbox on the layout indicator, such that previous
3 images are recalled by selecting the appropriate lightbox.

1 47. The independent display system of claim 37, further comprising:
2 a printer icon, permitting the user to print the medical images including
3 any marked regions of interest.

1 48. The independent display system of claim 47, wherein the printer
2 icon is present when the printer is enabled and connected to the system.

1 49. The independent display system of claim 47, wherein the printer
2 icon indicates whether the printer is available for use, offline, or out of paper.

1 50. The independent display system of claim 37, further comprising:
2 display adjustment icon, permitting the user to adjust a quality of the
3 medical images displayed.

1 51. The independent display system of claim 50, wherein the display
2 adjustment icon includes a plot of the display adjustment, indicating the
3 adjustment made.

1 52. The independent display system of claim 51, wherein the display
2 adjustment icon is a brightness and contrast icon, permitting the user to adjust
3 the brightness and the contrast of the image.

1 53. The independent display system of claim 52, wherein the
2 brightness and contrast icon further includes a reset area, such that when the
3 reset area is pressed by the user, the brightness and the contrast are reset to their
4 original values.

1 54. The independent display system of claim 51, wherein the display
2 adjustment icon is a gamma icon permitting the user to increase and decrease the
3 gamma of the image.

1 55. The independent display system of claim 54, wherein the gamma
2 icon further includes a reset area, such that when the reset area is pressed by the
3 user, the gamma value is reset to the original value.

1 56. The independent display system of claim 37, further comprising a
2 delay mechanism to delay displaying the image.

1 57. The independent display system of claim 56, wherein the delay
2 mechanism may be disabled.

1 58. The independent display system of claim 37, further comprising an
2 auto load mechanism to permit review of a preprogrammed series of images.

1 59. The independent display system of claim 58, wherein one of the
2 icons is a series movement icon to show a selected image in the series.

1 60. The independent display system of claim 37, further comprising a
2 historical review to show historical images of the same modality and the same
3 patient as the current image.

1 61. The independent display system of claim 60, wherein a set of the
2 plurality of icons are icons permitting navigation among the historical images.

1 62. The independent display system of claim 61, wherein the set of
2 icons include a current image icon, a baseline image icon, and navigation icons to
3 navigate a plurality images between the current image and the baseline image.

1 63. The independent display system of claim 60, further comprising a
2 loading logic to identify a patient and modality based on the identifier of the
3 medical image, and to load the appropriate historical images in response to a
4 user request.

1 64. The independent display system of claim 37, further comprising a
2 loading unit to identify a patient associated with the medical image and to load
3 relevant patient information.

1 65. The independent display system of claim 64, wherein the patient
2 information is patient data and patient history data.

1 66. The independent display system of claim 64, further comprising:
2 the touch screen to display the patient information.

1 67. The independent display system of claim 64, further comprising a
2 disabling logic to disable the loading unit from loading the patient information.

1 68. The independent display system of claim 37, further comprising a
2 toggle to display patient information.

1 69. A computer aided detection (CAD) system that analyzes medical
2 images comprising:

3 an image acquisition system to acquire a digitized medical image and
4 associate an image ID with the image;

5 an analysis system to identify regions of interest (ROIs);

6 a display mechanism to display the unmarked medical images; and

7 an independent display, independent from the analysis system, the
8 independent display comprising:

9 an input mechanism to receive the image ID and identify the
10 medical image associated with the image ID;

11 a screen to display the medical image including any marked
12 regions of interest;

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13 a plurality of icons to interact with the medical images on
14 the screen.

1 70. The CAD system of claim 69, wherein one of the plurality of icons
2 is a layout indicator shown on the display indicating a lightbox to which a
3 currently displayed medical image corresponds.

1 71. The CAD system of claim 70, wherein the layout indicator
2 comprises:
3 an icon of the independent display system positioned in proximity to one
4 or more icons of light boxes, reflecting an actual layout in a current location.

1 72. The CAD system of claim 71, further comprising:
2 a layout logic to permit the user to alter the layout indicator to correspond
3 to an actual layout in a current location.

1 73. The CAD system of claim 69, wherein one of the plurality of icons
2 is a printer icon, permitting the user to print the medical images including any
3 marked regions of interest.

1 74. The CAD system of claim 73, wherein the printer icon indicates
2 whether the printer is available for use, offline, or out of paper.
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1 75. The CAD system of claim 69, wherein one of the plurality of icons
2 is a display adjustment icon, permitting the user to adjust a quality of the
3 medical images displayed.

1 76. The CAD system of claim 69, further comprising a delay
2 mechanism to delay displaying the image.

1 77. The CAD system of claim 69, wherein the delay mechanism may be
2 disabled.

1 78. The CAD system of claim 69, further comprising an auto load
2 mechanism to permit review of a preprogrammed series of images.

1 79. The CAD system of claim 69, wherein one of the icons is a
2 Next/Done icon to show a next image in the series.

1 80. The CAD system of claim 69, further comprising a historical review
2 to show historical images of the same modality and the same patient as the
3 current image.

1 81. The CAD system of claim 80, wherein a set of the plurality of icons
2 are icons permitting navigation among the historical images.

1 82. The CAD system of claim 81, wherein the set of icons include a
2 current image icon, a baseline image icon, and navigation icons to navigate a
3 plurality of images between the current image and the baseline image.

1 83. The CAD system of claim 69, further comprising a loading logic to
2 identify a patient and modality based on the identifier of the medical image, and
3 to load the appropriate historical images in response to a user request.

1 84. The CAD system of claim 69, further comprising a loading unit to
2 identify a patient associated with the medical image and to load relevant patient
3 information.

1 85. The CAD system of claim 84, wherein the patient information is
2 patient data and patient history data.

1 86. The CAD system of claim 69, wherein one of the icons is a toggle to
2 show patient information.

1 87. The CAD system of claim 69, further comprising:
2 a frame sensor to monitor a motion of the display mechanism of a
3 motorized viewer in which patient image data is divided into frames, where
4 adjacent frames may contain image data from different patients, the frame sensor
5 to pass a frame data to the input mechanism of the independent display.

1 88. A method of displaying medical images from a computer aided
2 diagnostic (CAD) system comprising:
3 identifying a medical image based on an image identification;
4 identifying a lightbox for the image and highlighting the identified
5 lightbox on a lightbox icon;
6 displaying the image to the user.

1 89. The method of claim 88, further comprising:
2 displaying a plurality of lightbox icons for selection, and prompting the
3 user to select a lightbox layout corresponding to an actual layout at a current
4 location.

1 90. The method of claim 88, further comprising:
2 displaying a printer icon indicating whether the printer is connected or
3 not.

1 91. The method of claim 88, further comprising:
2 receiving an image adjustment signal from the user, and adjusting the
3 image quality of the medical image.

1 92. The method of claim 91, wherein the image adjustment signal is a
2 brightness and/or contrast adjustment.

1 93. The method of claim 91, wherein the image adjustment signal is a
2 gamma adjustment.

1 94. The method of claim 91, further comprising:
2 receiving a reset signal, in response to the user pressing a single selection,
3 and resetting the image quality to the original image quality in response to the
4 reset signal.

1 95. The method of claim 88, further comprising:
2 receiving an advance sequence signal indicating that the user has
3 completed review of the current medical image; and
4 displaying a subsequent medical image in a preprogrammed series in
5 response to the advance sequence signal.

1 96. The method of claim 88, further comprising:
2 receiving a request for a historical image;
3 identifying a patient and modality displayed in the current medical
4 image; and
5 retrieving images of the same patient and the same modality, if available.

1 97. The method of claim 96, further comprising:
2 enabling navigation among the historical images, including displaying a
3 current image icon, a baseline image icon, and navigation icons to navigate a
4 plurality images between the current image and the baseline image.

1 98. The method of claim 88, further comprising:
2 identifying a patient based on the image identification;

3 loading relevant patient information; and
4 indicating to the user that the patient information is available.

1 99. The method of claim 88, wherein the method is modality
2 independent.

1 100. The method of claim 88, wherein the image remains associated with
2 the lightbox on the layout indicator, such that previous images are recalled by
3 selecting the appropriate lightbox.

1 101. The method of claim 88, further comprising:
2 displaying a plot of a current image quality indicating the adjustment
3 made.

1 102. The method of claim 88, further comprising:
2 waiting a preset delay prior to displaying the image.

1 103. The method of claim 102, wherein the delay may be disabled.

1 104. The method of claim 88, further comprising a loading unit to
2 identify a patient associated with the medical image and to load relevant patient
3 information.

1 105. The method of claim 104, wherein the patient information is patient
2 data and patient history data.

1 106. The method of claim 104, further comprising a disabling logic to
2 disable the loading unit from loading the patient information.

1 107. The method of claim 104, wherein one of the icons is a toggle to
2 display patient information.

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